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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/985,727	11/06/2001	Naomi Ishizuka	Q67047	4223

7590 09/12/2002  
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EXAMINER

PATEL, ISHWARBHAI B

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 09/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/985,727

Applicant(s)

ISHIZUKA ET AL.

Examiner

Ishwar (I. B.) Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. This application contains claims directed to the following patentably distinct species of the claimed invention:

Specie I	Figure 7.
Specie II	Figure 14.
Specie III	Figure 15.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record

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showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Frank J. Osha (24,625) on March 25, 2002 a provisional election was made with traverse to prosecute the invention of 1-14, claim. Affirmation of this election must be made by applicant in replying to this Office action.

### ***Drawings***

2. The drawings are objected to because the figures are improperly cross-hatched (figures 2, 3, 8, 10A and 15 in particular). All of the parts shown in section and only those parts must be cross-hatched. The cross hatching pattern should be selected from those shown on page 600-81 of the MPEP based on the material of the part. See 37 CFR 1.84(h)(3) and MPEP 608.02.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. Figures 1-6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1 and 2 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1 and 2, it is not clear what is meant by “the land and conductive member are mounted by lead-free solder”. The conductive member is inserted into the hole with lands. Land is already there with the respective through hole and only conductive member of the electrical part is mounted.

Furthermore, regarding claim 2, “the width of each land corresponding to the difference between the radius of each land and each through hole is set **such a value that the intimate contact strength of said land is larger than the land exfoliating force**” is vague and is not showing any specific structural value. The “exfoliating force” has many variables such as the material for solder and bonding of the land with the

insulator is also varying with the material used for both the insulator and the land material.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkhel et al., U. S. Patent 5,730,932, hereafter Sarkhel and Yoshiaki et al., Japanese Patent JP408125303A, hereafter Yoshiaki.

Regarding claim 1 and 2, Sarkhel discloses a circuit board having circuit wires on the surface and back surface thereof, comprising:

lands having through holes through which conductive members of electrical parts are inserted, said through holes being coated with a conductive film on the side surface themselves, wherein said conductive member is mounted using lead-free solder (see figure 3, column 4, line 52-67), but

does not explicitly disclose the width of each land corresponding to the difference between the radius of each land and each through hole is set at 0.40 mm or more.

However the width of the land corresponding the hole diameter will depend upon the strength required for that particular conductive connection and will vary depending upon the component and corresponding insert size, type of solder and total fillet length.

Further, the opening of the land can be adjusted by controlling the resist or mask opening on the surface to get the desired defect free electrical and mechanical reliability and can be arrived at an optimum value. Yoshiaki disclose a circuit board with various opening of the resist to have the desired defect free connection. Therefore, it would have been obvious to one having ordinary skill in art at the time the invention was made to provide the circuit board of Sarkhel with land width with the desired fillet opening as taught by Yoshiaki as claimed in claims 1 and 2, to have a strong and reliable connection without any defect.

Regarding claims 3 and 4, the modified assembly of Sarkhel further discloses fillet of lead free solder formed between the each land the conductive member, see figure 3.

Regarding claims 5 and 6, the modified assembly of Sarkhel further discloses the lead-free solder contain tin-silver based solder (column 3, line 5-20).

Regarding claims 7 and 8, though the modified assembly of Sarkhel does not disclose the pitch of the land between 1 to 5 mm, the pitch will depend upon the component density required for a specific combination of the circuit board and the

component and its conductive member size and can be arrived at a desired value. More over the modern trend is to increase the component density to have a smaller overall device size. Therefore, it would have been obvious to one having ordinary skill in art at the time the invention was made to provide the circuit board of Sarkhel with the desired pitch of the land as claimed in order to have increased component density and resultant smaller device size.

Regarding claims 9 and 10, the assembly of Sarkhel discloses more than two conductive members lines with more than two or more conductive members (conductive line for member 37 and 38,39, see figures 3.

Regarding claim 11 and 12, Sarkhel further discloses the electronic part is IC, see figure 3, column 52-67.

Regarding claim 13 and 14, Sarkhel further discloses that the invention is for microelectronic applications, which can be any electronic equipment, column 1, line 5-7.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bora et al., Tsunashima, Strobel, J. A. Raciti, Chiba et al., Toshiichi et al., and Yasuho discloses the circuit board assembly similar to applicant's claimed invention.




Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (703) 305 2617. The examiner can normally be reached on M-F (6:30 - 4) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (703) 305 9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3431 for regular communications and (703) 305 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

ibp  
September 7, 2002

  
DAVID L. TALBOTT  
SUPERVISORY PATENT EXAMINER  
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